

岩瀬大地

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Potential of Bamboo Bicycle Production for Promoting Sustainable Community Development in Rural Areas

Today many rural areas across the world are faced with issues such as, depopulation, and an aging of population. These contribute to further issues and lead to many rural areas becoming impoverished. This paper discusses the potential of bamboo bicycle design to promote sustainable community development in rural areas. This research employs case studies as the methodology, in order to observe how bamboo bicycle production plays economic, social, and environmental roles in the community development of rural areas in Indonesia and Japan. Data was collected by interviews with the parties concerned and by participant observation. The research findings showed that introducing bamboo bicycle production into rural areas could contribute to: 1) reorganizing local resources for creating sustainable community development in rural areas; 2) promoting the local production and consumption of manufacturing and food through urban–rural exchanges; 3) improving environmental issues; 4) raising environmental awareness; 5) creating social capital; and 6) creating diverse opportunities. This paper concludes that bamboo bicycle design could be a driving force for promoting sustainable community development in rural areas.

Keywords: Bamboo Bicycle; Sustainable Community Development; Rural-Urban Exchange; Social Design; Green Tourism

1. Introduction

Today, many rural areas across the world are faced with issues such as depopulation, and an aging population. These contribute to other issues in rural areas such as the increase of vacant houses and abandoned farmlands, the absence of leaders in agriculture, economic decline, lack of job opportunities, loss of local traditions, devastation of forests, insufficient provision of public services, and deterioration of infrastructure. In the face of this, some villages in rural areas may ultimately cease to exist. In Japan, it is predicted that about 896 municipalities will disappear by 2040¹.

Promoting urban–rural exchanges, or stimulating the flow of urban population to rural areas, can help to improve or solve issues facing rural areas, because it stimulates the comings and goings of people, information, and commodities (e.g. agriculture, forestry and fishery products, and money) between urban and rural areas². Therefore, attracting people from urban to rural areas can be a significant driving force for sustainable community development in rural areas. In order to do this, it is essential that rural areas develop attractions by utilizing the local resources available in their communities.

2. About bamboo

Bamboo is a fast-growing plant that can be adult plant in four or five years. It has also spread to many parts of the world. Bamboo is distributed over regions where the climate is warm and wet, such as the temperate and tropical areas of Asia, the northern part of Australia, and the central part of Africa. Generally, however, it does not grow in North Africa, Europe, and North America³. Traditionally, people who could obtain bamboo easily around their communities used to use bamboo in almost every aspect of everyday life, such as foodstuffs, life's necessities, and buildings (Fig. 1).



Figure 1 Examples of various practical use of bamboo^{4, 5, 6}

Bamboo can be regarded thus as a universal material, which can be applied to many useful things in modern life⁷. Moreover, making bamboo products does not require sophisticated technology or a large investment of capital, because almost all products can be manually produced with simple tools and skills.

3. Research methodology

This research employs case studies as the methodology in order to observe how bamboo bicycle production plays social, economic, and environmental roles in the community development of rural areas in Indonesia and Japan⁸. In each case study, the author analyzes their development in order to

grasp individual patterns, and discusses the potential of bamboo bicycle design for creating sustainable community development in rural areas. Data was collected by interviews with the parties concerned and by participant observation.

4. Spedagi bamboo bicycles

Spedagi is a social design project created in 2013 by Mr. Singgih Susilo Kartono, an Indonesian product designer. “Spedagi” is a word coined by him, which combines the Indonesian words *sepeda*, meaning “bike” with *pagi*, meaning “morning.” Accordingly, Spedagi literally means riding a bicycle in the morning. Kartono developed his bamboo bicycle for biking in the morning and started Spedagi to reactivate bike riding in Kandangan village (his birthplace) in Temanggung, Central Java (Fig. 2).

4.1. Case 1: Spedagi Indonesia

4.1.1. Social role

Bamboo is an abundant material in Kandangan village. Traditionally, it has been used in building, agriculture, and everyday items. Nowadays, plastic products have replaced bamboo products therefore the villagers do not respect bamboo. A traditional building made of bamboo is now even a symbol of poverty⁹. However, when Kartono made his bamboo bicycle, which is not a traditional craft, and traveled around the village on the bicycle, the villagers realized a new potential for bamboo. Moreover, the bicycle attracts visitors from outside the village because of its unique appearance. Attracting outside visitors contributes to preserve the local lifestyle, food culture, and traditions such as the local batik (a traditional Indonesian fabric that is made with wax-resist dyeing) — traditions that otherwise would be buried in oblivion. The bicycle also stimulates communication and interaction between the villagers and visitors, which helps to promote and build confidence about the village.

4.1.2. Economic role

Traveling around the village on a bamboo bicycle can have positive impacts on the local economy because of its ripple effect. Although the number of visitors is still small at present, they spend money while staying at guesthouses or homestays, and eat local food at diners and the market. The current number of visitors is not enough, however, to create new job opportunities in the village. In the future, as more visitors come to the village, more job opportunities that support Spedagi will be created in the village, for example, renting bamboo bicycles and community workshops to experience producing bamboo bicycles.

4.1.3. Environmental role

Making a bamboo bicycle helps to manage or maintain the village’s bamboo forest properly. If bamboo is not cut, the bamboo forest will be overgrown and therefore devastated, which will affect animals living in the forest. This is because bamboo grows in just a few years and the forest quickly becomes overgrown. In addition, making bamboo bicycles helps to improve the cleanliness of the forest. The forest had been dumpsite for villagers; however, the villagers have realized a new potential of bamboo, which has raised their awareness of the importance of the forest. Properly managed, the forest itself can be even an attraction for the village. Some villagers are engaged in brick manufacturing, which uses fertile topsoil in the area. This damages the area’s agricultural productivity. Hence, from an environmental standpoint, it is urgent that this destructive activity is replaced by another industry, like Spedagi. Attracting outside visitors has raised the awareness of villagers that the village’s landscape should be protected.



Figure 2 Left – Bamboo bicycle made in Kandagan village and riding bamboo bicycle in Kandagan village

5. Spedagi Japan

Japan is now faced with the challenges of an aging population and depopulation. Japan's total population has been declining since 2008 and the aged population has been increasing. It is predicted that this trend will continue for decades to come. A way to coexist with this issue must be found. Moreover, Japan is a country that imports resources from all over the world, such as foodstuffs, energy, and wood. All these issues create the situation whereby rural areas are exhausted. And exploiting finite natural resources from the environment and transporting them all into the country helps to cause environmental issues such as global warming and resource depletion. Within this context, the idea of making a bamboo bicycle, utilizing locally available bamboo to reactivate rural areas, began in Japan in 2015, when Spedagi Japan was established as a general incorporated association. Following this, Spedagi Ato and Spedagi Tokyo were established. Exploration of how Spedagi could bring about the reactivation of rural areas in the Japanese context has recently started.

5.1. Case 2: Spedagi Ato

Ato village is located near Yamaguchi city, Yamaguchi Prefecture, in the western region of Japan. Spedagi Ato is based in a closed school in Ato. Here, members of Spedagi Ato developed their bamboo bicycle (Fig. 3). Similar to Kandagan village, Ato also uses the bamboo bicycle to attract people from outside the village. Visitors can ride on bamboo bicycles around the village.

5.1.1. Social role

Spedagi connects local resources such as the bamboo forest, local agriculture, a closed school, and unused houses, which converts this area into a tourist attraction; otherwise these resources are isolated. Some social issues such as vacant houses and the closed school are converted to positive outcomes. Spedagi makes local people realize that they have rich local resources, which can attract visitors. It also facilitates communication and interaction between local people and visitors, and creates stronger personal relationships and social bonds as a result of improved interaction among local people.

5.1.2. Economic role

Although green tourism has started to emerge at Ato with Spedagi, the number of visitors is relatively small at present. Spedagi Ato attracts the visitors to experience riding a bamboo bicycle. However, it is urgent that basic tourist facilities, such as accommodation and rest areas, are provided for visitors. This does not require a large capital investment because there are many vacant houses in

Ato, so these houses can be repurposed into such facilities. Building these basic facilities will create jobs at Ato to help cater for visitors¹⁰.



Figure 3 Left – Bamboo bicycle made of Ato's bamboo and Riding bamboo bicycle in Ato

5.1.3. Environmental role

Spedagi Ato developed a bicycle made of local bamboo with open house.inc. Utilizing local bamboo to make a bicycle facilitates the effective utilization of local natural resources and creates economic profit. Spedagi raises awareness among the parties concerned that the rural atmosphere and scenery of Ato should be preserved, because it attracts visitors.

5.2. Case 3: Spedagi Tokyo

A bamboo balance bicycle for children was designed by Lect. Keigo Honda at the Kuwasawa Design Institute in Tokyo and the author in Tokyo Zokei University (Fig. 4).



Figure 4 Bamboo balance bicycle for children made in Tokyo

Honda and the author are the delegates of Spedagi Tokyo. In the same way as the previous two cases, Spedagi Tokyo aims to attract people from urban Tokyo to the surrounding rural area by developing a workshop program centered upon the bamboo balance bicycle (Fig. 5). Spedagi Tokyo is now operating in rural areas of Tokyo such as Tama city, located in the western part of Tokyo Metropolis.



Figure 5 Left: Children on balance bikes; and right: Spedagi Tokyo workshop

5.2.1. Social role

Spedagi Tokyo promotes face-to-face communication between visitors and local people in rural areas (e.g. conversation between farmers and visitors), which helps to create stronger interpersonal relationships. Moreover, it facilitates the connection of local resources for catering to visitors, which creates collaboration among the parties concerned. Although Spedagi Tokyo alone cannot solve the issues faced by the bamboo forests and forestry in Tokyo (e.g. shortage of useable bamboo, lack of market competitiveness, and lack of successors), it helps to raise awareness of these issues among visitors.

5.2.2. Economic role

Spedagi Tokyo organizes a workshop that aims for participants to fully enjoy the attractiveness of rural areas. It includes activities such as making bamboo balance bikes with the family, children riding them in the village, eating locally produced food and buying products made of local materials (Fig. 6). Spedagi Tokyo helps to improve consumers' awareness of locally made products and facilitates the local production of food and manufacturing by villagers and its consumption by visitors. Local people, however, require improved skills to make products out of bamboo.



Figure 6 A local food made for workshop participants

5.2.3. Environmental role

Rural areas can be a tourist destination for weekend holiday making, so Spedagi Tokyo can regularly attract visitors from nearby tourist-generating areas to engage in volunteer forestry activities (e.g. forest thinning and bamboo cutting) as a part of their holiday. This helps to improve the rural area's environmental issues. Spedagi Tokyo also can increase the consumption of local natural resources, especially bamboo, which if left uncut can cause issues such as invasion into residential areas.

6. Research findings

From the analysis above, the author found that Spedagi can bring about many changes. The research findings are as follows.

6.1. Reorganizing local resources for creating sustainable community development

The bamboo bicycle can be a hub that connects local resources (e.g. agriculture, traditional culture, vacant houses, and forestry) to promote sustainable community development. That is, local resources that are otherwise scattered, isolated, or unused are organized into a tourist attraction, which will appeal to people from urban areas to visit rural areas. Some local issues, such as a closed school and vacant houses, can be positively utilized for Spedagi. Traveling around rural areas on bamboo bicycles can be a means of green tourism that allows visitors to fully enjoy the attractiveness of rural areas. However, it is significant that every actor involved in the process makes a collaborative effort in order to maintain and enhance visitors' holiday experiences.

6.2. Promoting local production and consumption through urban–rural exchanges

A flow-on effect is that local production and consumption of manufacturing and food will be promoted between rural and urban areas, because people from urban areas will eat local food and buy freshly harvested agricultural products and local items made of local materials at local markets. Visitors will come to make things such as bamboo bicycles, bamboo balance bicycles for their children, or daily necessities made of local materials (e.g. bamboo and wood). Opening a community workshop (e.g. Fab Lab) might help to facilitate this, because it helps visitors to make items and process local materials with equipment such as a 3D printer and laser cutter. Over-concentrated production, stemming from the over-concentration of capital, will be distributed over a greater geographical area. Therefore, promoting the local production and consumption of manufacturing and food helps to create jobs at a local level, jobs that improve the well-being of visitors and help to bring about economic profits to rural areas. Urban–rural exchanges also lead to preserving local culture.

6.3. Contributing to improve environmental issues

The regular use of local bamboo helps to protect the local forests' ecology and to reduce the invasion of bamboo into populated areas. Moreover, the use of local bamboo can contribute to reducing the consumption of plastics derived from petroleum. Spedagi's promotion of local production and consumption of manufacturing and food can contribute to reducing greenhouse gas emissions along the entire life cycle of these products, including raw material acquisition, design, production, transportation, use, and final disposal.

6.4. Raising environmental awareness

Spedagi has the potential to attract people from urban areas to visit rural areas. It helps visitors to realize the importance of their rich natural environment through enjoying the beauty of rural areas. For example, this is brought about through: 1) receiving the blessings of nature through agricultural

and forestry experiences; 2) having relaxing experiences in a forest or rural atmosphere; 3) seeing a variety of animals with their own eyes; and 4) learning about the ecosystem services provided by the natural environment (e.g. providing clean air, water, raw materials, and recreation).

6.5. Creating social capital

Building face-to-face relationships through Spedagi creates a warm link between people in rural and urban areas. As people in rural areas collaborate to attract people from urban areas, social bonds are strengthened locally. Creating warm links and social bonds helps to reactivate rural areas socially, economically, and environmentally. Therefore, creating and accumulating social capital is a necessary part of creating sustainability in the community development of rural areas.

6.6. Creating diverse opportunities

Probably any rural area that can grow bamboo, or a suitable substitute, can start Spedagi to create sustainable community development. However, interested people need the know-how of bamboo processes. At this point, Spedagi usually opens the design of bamboo bicycles and shares knowledge about how to make them through their network.

7. Conclusion

This study investigates the potential of bamboo bicycle design for promoting sustainable community development in rural areas. The research findings show that introducing bamboo bicycles into rural areas can contribute to: 1) reorganizing local resources create sustainable development in rural areas; 2) promoting local production and consumption of manufacturing and food through urban–rural exchanges; 3) improving local environmental issues; 4) raising environmental awareness; 5) creating social capital; and 6) creating diverse opportunities. Therefore, bamboo bicycle design can be a driving force for promoting sustainable development in rural areas.

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